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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.				
09/885,319	06/19/2001	Mark A. Stan	1613370-0006	4594				
7470 WHITE & CASE LLP PATENT DEPARTMENT 1155 AVENUE OF THE AMERICAS NEW YORK, NY 10036	7590 10/09/2007		<table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">BARTON, JEFFREY THOMAS</td></tr></table>		EXAMINER		BARTON, JEFFREY THOMAS	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/885,319	Applicant(s) STAN ET AL.	
	Examiner Jeffrey T. Barton	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 54-56,58-82,105-111 and 115-120 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 54-56,58-64,105-111 and 115-120 is/are allowed.
- 6) ☒ Claim(s) 65-82 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 25 July 2007 does not place the application in condition for allowance.

Status of Objections and Rejections Pending Since the

Office Action of 26 March 2007

2. The objection to the oath is withdrawn due to the submission of an oath signed by all inventors.
3. The rejection of claims 65-68 and 71 under 35 U.S.C. §102(b) as anticipated by Chiang et al is withdrawn due to Applicant's amendment.
4. The rejection of claims 54-56 and 59-64 under 35 U.S.C. §102(e) as anticipated by Ermer et al is withdrawn due to the submission of a declaration demonstrating invention of the subject matter of these claims prior to the effective filing date of Ermer et al.
5. The rejection of claims 65-67, 69, 71, and 72 under 35 U.S.C. §102(e) as anticipated by Ermer et al is maintained because the declaration does not show that the subject matter of these claims was invented prior to the effective filing date of Ermer et al.
6. The rejection of claims 65 and 71 under 35 U.S.C. §103(a) as unpatentable over Olson is maintained.

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7. The rejection of claim 72 under 35 U.S.C. §103(a) as unpatentable over Olson in view of Friedman et al is maintained.

8. The rejection of claims 65-68, 71, and 72 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Friedman et al is withdrawn due to Applicant's amendment.

9. The rejection of claims 65-68, 71, and 73 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Stanbery is withdrawn due to Applicant's amendment.

10. The rejection of claims 65-71 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Wiesmann is withdrawn due to Applicant's amendment.

11. The rejection of claims 74-76 and 78-82 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Wiesmann is maintained.

12. The rejection of claim 72 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Wiesmann and Friedman et al is withdrawn due to Applicant's amendment.

13. The rejection of claim 77 under 35 U.S.C. §103(a) as unpatentable over Chiang et al in view of Wiesmann and Friedman et al is maintained.

14. The rejection of claims 54-56, 58-64, and 74-82 under 35 U.S.C. §103(a) as unpatentable over Ermer et al in view of Wiesmann is withdrawn due to the submission of a declaration demonstrating invention of the subject matter of these claims prior to the effective filing date of Ermer et al.

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15. The rejection of claims 65-72 under 35 U.S.C. §103(a) as unpatentable over Ermer et al in view of Wiesmann is maintained because the declaration does not show that the subject matter of these claims was invented prior to the effective filing date of Ermer et al.

16. The rejection of claim 73 under 35 U.S.C. §103(a) as unpatentable over Ermer et al in view of Wiesmann and Stanbery is maintained because the declaration does not show that the subject matter of these claims was invented prior to the effective filing date of Ermer et al.

Declaration under 37 C.F.R. §1.131

17. The data and statements of the declaration are considered to be sufficient to demonstrate invention of the subject matter of claims 54-56, 58-64, and 74-82 prior to the effective filing date of Ermer et al. However, the statement of section 24, "As a result of the execution of the steps set forth for layer #10 in the Exhibit, a layer of GaAs is grown over the layer of InGaP" appears to contradict the data shown in the Exhibit. Based on the rows labeled with "TMAI", the data for layer #10 appears to show nonzero flow of trimethylindium into the reactor along with the trimethylgallium and arsine, which would of course have led to deposition of indium gallium arsenide, as opposed to the gallium arsenide required for claim 65. Since the term "composed of GaAs" in line 3 of claim 65 is construed as being analogous to "consisting of GaAs" or "consisting essentially of GaAs" (Note MPEP §2111.03), the deposition of a layer comprising nontrivial amounts of indium is not considered to demonstrate a layer "composed of

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GaAs" as required in the claim, and the declaration is considered deficient for this reason. As such, the rejections of claims 65-73 based on Ermer et al are maintained.

Claim Rejections - 35 USC § 112

18. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

19. Claim 72 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no disclosure of a lower limit of 201 Angstroms on the thickness of the barrier layer in the Application as originally filed.

Claim Rejections - 35 USC § 102

20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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21. Claims 65-67, 69, 71, and 72 are rejected under 35 U.S.C. 102(e) as being anticipated by Ermer et al. (U.S. Patent 6,380,601).

Ermer et al discloses a multijunction solar cell having a germanium substrate (22) doped with an n-type dopant; a nucleation layer (34) comprising of indium gallium phosphide (InGaP), a second cell layer (36) of gallium arsenide (GaAs), and a third cell layer (44) of InGaP (see col. 2, line 53 to col. 4, line 46). The nucleation layer (34) is formed at a preferred thickness of 25 Angstrom to 500 Angstrom and has a lattice parameter at a desired degree of lattice matching to the substrate (22) either "matched, or selectively made non-matching" (see col. 3, lines 28-49). The solar cell of Ermer et al would inherently absorb radiation ranging from UV radiation to a wavelength of 1800 nm through the use of Ge, GaAs and InGaP layers. Phosphorous is the preferred n-type dopant in the Ge substrate 22 (see col. 3, line 1). The junction depth in the Ge substrate (22) ranges from 0.1 microns to 3 microns (see col. 3, lines 7-10).

As subsequent layers are formed, the nucleation layer (34) would control the diffusion of dopant atoms into the substrate (22). At the elevated temperatures at which the semiconductor layers are formed, solid state diffusion of dopants, such as arsenic from the GaAs layer (36), would be controlled by the thickness of the nucleation layer (34). Ermer et al discloses that "the invention allows for better passivation of the germanium homojunction substrate and shallower doping profiles with better control over diffused dopant concentrations" (see col. 1, lines 63-66).

Since Ermer et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

24. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

25. Claims 65 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olson (U.S. Patent 5,342,453).

With respect to claims 65 and 71, Olson teaches a solar cell comprising a substrate that can be germanium (Ge), a GaInP₂ passivating layer in direct contact with the substrate; and a solar cell containing GaAs over the passivating layer (see col. 3, line 22 through col. 4, line 50; and claims 10, 11, and 15-17; and Figure 1). Said GaInP₂ passivating layer reads on the barrier layer in instant claims 65 and 71. With respect to claim 61, it is the Examiner's position that Olson's solar cell is capable of photoactively converting radiation ranging from approximately UV radiation to radiation having a wavelength of approximately 1800 nm. Olson teaches the limitations of the instant claims, other than the difference which is discussed below.

Olson does not specifically require the Ge be used as the substrate since the substrate can be selected from three other substrates (see claims 10 and 15). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Ge as the substrate in Olson's solar cell because such is clearly within the scope of Olson's disclosure.

26. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Olson as applied to claims 65 and 71 above, and further in view of Friedman et al, "Back Surface Fields for GaInP₂ Solar Cells," IEEE, (1991), pages 358-360.

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Olson, as relied upon for the reasons recited above, teaches the limitations of claim 72, the difference being that Olson does not specifically teach the thickness of its GaInP₂ passivating layer. Friedman teaches a GaInP₂ back surface field passivating layer having a thickness of 0.02 microns, i.e., 200 Angstroms (see the entire document, in particular Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Olson's GaInP₂ passivating layer such that it has a thickness of 200 Angstroms because such is a conventional thickness of a GaInP₂ passivating layer, as shown by Friedman et al. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. There is absolutely no basis in the specification as filed or the knowledge of anyone skilled in the art that a layer of 201 Angstrom thickness will function differently from one 200 Angstroms thick. In addition, 201 Angstroms is within the uncertainty of the reported thickness of 0.02 micrometers shown in Figure 1 of Friedman et al.

27. Claims 74-76, and 78-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al, Experimental Results of GaInP₂/GaAs/Ge Triple Junction Cell Development for Space Power Systems," 25th IEEE PVSC, May 13-17, 1996, pages 183-186, in view of Wiesmann (U.S. Patent 4,634,605).

As seen in Figure 2 at page 184, Chiang et al teaches a triple junction solar cell having a germanium (Ge) substrate with a subcell formed therein with an n-type Ge layer overlying a p-type Ge substrate, and wherein the n-type Ge layer is formed by diffusion of arsenic; and a second cell including a layer of GaAs disposed over the substrate. A layer of InGaP that reads on the instant nucleation layer is present over the substrate. Chiang et al teaches the limitations of the instant claims, other than the difference which is discussed below.

Chiang et al does not specifically teach that its n-type Ge layer is formed by diffusion of phosphorous or both phosphorous and said arsenic. Wiesmann discloses the use of both arsenic and phosphorous in combination as an n-type dopant (col. 7, lines 21-25). The use of arsenic and phosphorous as n-type dopants is very well known in the art, and they are functional equivalents of each other.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the n-type dopant in the solar cell of Chiang et al so as to use phosphorous or both phosphorous and arsenic, as taught by Wiesmann, because phosphorous and arsenic are functional equivalents. With respect to claim 74 and its dependent claims, it would have been well within the skill of an artisan to have used, for example, much more phosphorous dopant than arsenic dopant, thus resulting in a higher concentration of phosphorous atoms than arsenic atoms throughout the diffusion region (including the upper portion has here claimed), which the expectation that an n-doped germanium diffusion layer would be obtained in a working solar cell. Since there is no structural distinction between the structure claimed and that of the

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prior art, the cell of Chiang et al in view of Wiesmann is considered to inherently have the properties claimed in claims 78, 80, and 81.

28. Claim 77 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al in view of Wiesmann as applied to claims 74-76, and 78-82 above, and further in view of Friedman et al, "Back Surface Fields for GaInP₂ Solar Cells," IEEE, (1991), pages 358-360.

Chiang et al in view of Wiesmann, as relied upon for the reasons recited above, teaches the limitations of claims 72 and 77, the difference being that Chiang et al does not specifically teach the thickness of its GaInP back surface field passivating layer, whereas said claims 72 and 77 specify a thickness of 350 Angstroms or less. Friedman teaches a GaInP₂ back surface field passivating layer having a thickness of 0.02 microns, i.e., 200 Angstroms (see the entire document, in particular Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Chiang et al's GaInP back surface field passivating layer such that it has a thickness of 200 Angstroms because such is a conventional thickness of a GaInP back surface field passivating layer, as shown by Friedman et al.

29. Claims 65-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ermer et al (U.S. Patent 6,380,601) in view of Wiesmann (U.S. Patent 4,634,605).

Ermer et al discloses a multijunction solar cell having a germanium substrate (22) doped with an n-type dopant; a nucleation layer (34) comprising of indium gallium

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phosphide (InGaP), a second cell layer (36) of gallium arsenide (GaAs), and a third cell layer (44) of InGaP (see col. 2, line 53 to col. 4, line 46). The nucleation layer (34) is formed at a preferred thickness of 25 Angstrom to 500 Angstrom and has a lattice parameter at a desired degree of lattice matching to the substrate (22) either "matched, or selectively made non-matching" (see col. 3, lines 28-49). The solar cell of Ermer et al would inherently absorb radiation ranging from UV radiation to a wavelength of 1800 nm through the use of Ge, GaAs and InGaP layers. Phosphorous is the preferred n-type dopant in the Ge substrate 22 (see col. 3, line 1). The junction depth in the Ge substrate (22) ranges from 0.1 microns to 3 microns (see col. 3, lines 7-10).

As subsequent layers are formed, the nucleation layer (34) would control the diffusion of dopant atoms into the substrate (22). At the elevated temperatures at which the semiconductor layers are formed, solid state diffusion of dopants, such as arsenic from the GaAs layer (36), would be controlled by the thickness of the nucleation layer (34). Ermer et al discloses that "the invention allows for better passivation of the germanium homojunction substrate and shallower doping profiles with better control over diffused dopant concentrations" (see col. 1, lines 63-66).

Ermer et al teaches the limitations of the instant claims, other than the difference which is discussed below.

Ermer et al does not specifically teach the use of arsenic or both phosphorous and arsenic in place of the phosphorous that is used to form the n-type dopant layer in its Ge substrate (22). Wiesmann discloses arsenic, phosphorous, or the use of both arsenic and phosphorous in combination as an n-type dopant (col. 7, lines 21-25). The

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use of arsenic and phosphorous as n-type dopants is very well known in the art, and they are functional equivalents of each other.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the n-type dopant in the solar cell of Ermer et al so as to use arsenic or both phosphorous and arsenic, as taught by Wiesmann, because phosphorous and arsenic are functional equivalents. With respect to claim 74 and its dependent claims, it would have been well within the skill of an artisan to have used, for example, much more phosphorous dopant than arsenic dopant, thus resulting in a higher concentration of phosphorous atoms than arsenic atoms throughout the diffusion region (including the upper portion has here claimed), which the expectation that an n-doped germanium diffusion layer would be obtained in a working solar cell.

30. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ermer et al in view of Wiesmann as applied to claims 54-56, 58-72 and 74-82 above, and further in view of Stanbery (U.S. Patent 4,322,571).

Ermer et al in view of Wiesmann, as relied upon for the reasons recited above, teaches the limitations of claim 73, the difference being that Ermer et al in view of Wiesmann does not specifically teach the formation of a two-step diffusion profile, i.e., first and second diffusion sublayers in the Ge substrate. Stanbery discloses a method for forming a solar cell with a two-step diffusion profile. The solar cell has areas with a deep junction, which has a high thermal stability, an areas of shallow junctions, which have high light-to-electrical energy conversion efficiencies (col. 5, lines 64-68).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell of Ermer et al in view of Wiesmann so as to use a two-step diffusion profile as taught by Stanbery because the two-step diffusion profile has high thermal stability and a high conversion efficiency.

Response to Arguments

31. Applicant's arguments filed 25 July 2007 have been fully considered but they are not persuasive.

Applicant's arguments concerning the declaration under 37 CFR §1.131 are partially persuasive, and the rejections of claims 54-56, 58-64 and 74-82 that were based on the teachings of Ermer et al have been withdrawn. The declaration is considered deficient relative to claims 65-73 for the reasons given in section 17 above.

Applicant argues that Olson does not disclose a barrier layer functioning to inhibit the diffusion of arsenic into the germanium substrate. It is immaterial whether Olson teaches the claimed function. The structure of Olson is the same as that claimed, and the rejection is therefore clearly proper.

Regarding the rejection of claim 72 over Olson in view of Friedman et al, Applicant argues that the claim is patentably distinct because the lower limit of the thickness range is 201 Angstroms instead of the 0.02 micrometers (200 Angstroms) disclosed by Friedman et al. The claimed range clearly constitutes new matter, as put forth above in the rejection under 35 U.S.C. §112, first paragraph. In addition, as noted above, 201 Angstroms is within the uncertainty of the thickness reported by Friedman et

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al, and there is absolutely no basis for believing a layer 200 Angstroms thick will operate differently than a layer 201 Angstroms thick. The claim is clearly unpatentable.

Regarding the rejections over Chiang et al in view of Wiesmann, Applicant argues that Wiesmann does not teach providing arsenic and phosphorus dopants to a germanium substrate. The Examiner maintains that anyone of ordinary skill in the art is well aware that phosphorus and arsenic provide n-type doping to any Group IV semiconductor, such as germanium and silicon. The function of As and P dopants taught by Wiesmann would have instantly been recognized by a skilled artisan as being applicable to either Ge or Si semiconductors, and the rejection is therefore maintained.

Allowable Subject Matter

32. Claims 54-56, 58-64, 105-111 and 115-120 are allowed.

Conclusion

33. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
25 September 2007



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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700